PINNOCK'S CATECHISMS.

CATECHISM

OF

BOTANY;

BEING

A PLEASING DESCRIPTION

of The

Aegetable Kingdom.

BY A FRIEND TO YOUTH,

Price Nine-pence.

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To attempt a description of the various plants the earth produces, the method of raising them, and their uses, would exceed the compass of many volumes. This little Introductory Work of course professes no such object. It is written with the sole view of rendering more easy the study of a science, which at the present day is cultivated by all those who have any pretensions to a polite education; and if it be considered in a moral point of view, this study is well calculated to furnish us with instruction, and conduct us, by gentle steps, to the knowledge of that Great Being, who has condescended to form plants with so much delicacy, and grace them with such a variety of beauties.

CATECHISM

OF

BOTANY.

CHAPTER I.

Introduction.

Question. What is Botany?

Answer. Botany is that science which arranges and distinguishes all plants or vegetables, and teaches us their peculiar properties and uses.

- Q. What are included under the denomination of plants, or vegetables?
- A. Plants or vegetables are all those bodies which have organization and life, but are destitute of sensibility and the powers of voluntary motion; deriving their nourishment from the earth in which they grow.

Q. Are they not extremely numerous?

A. Yes: it is supposed there are upwards of twenty thousand species of plants, which compose what naturalists have termed the Vegetable Kingdom; nor will this number appear so very surprising, when we consider that the whole surface of the earth, subterranean passages, and the bottom of the sea, are covered with them.

CHAP. II.

Of the Structure of Plants in general.

- Q. Or what does a perfect plant consist?
- A. A perfect plant consists of the trunk or stem, the root, the leaves, the supports, the flower, and the fruit.
 - Q. What is the trunk or stem?
- A. The trunk is composed of six organic parts, namely,
- 1. The epidermis, or cuticle, which is the outward thin covering, formed of fibres, and

serves to protect the bark from the effects of the cold, &c.

- 2. The cortex, or outer bark.
- 3. The liber, or inner bark.
- 4. The alburnum, which is a soft white substance, situate between the liber and the wood.
- 5. The wood, or lignum, which is the compact fibrous substance, surrounding the pith.
- 6. The medulla, or pith, which is a soft white substance, and in young plants is very copious, but diminishes as the plant grows, and at length disappears.
 - Q. What is the root?
- A. The root, which enables the tree to stand firm in the ground, and which absorbs the juices from the earth necessary for its growth, is a continuation of the trunk descending into the earth, and consists of the same parts, although less conspicuous.
 - Q. What are the leaves?
- A. The leaves, which differ much in their forms and manner of growth, consist of an immense number of fibres, termed the nerves

of the leaf, but which are merely its vessels, running in every direction, and branching out into innumerable small threads. The surface of the leaf, like the skin of animals, is full of pores, which serve both for respiration and the absorption of dew, air, &c., thereby nourishing the plant, and contributing to its growth.

Q. What are the supports?

A. The supports, or *fulcra*, are certain external parts of plants, which are useful to support and defend them from enemies and injuries. They are divided into seven kinds.

Q. Describe them.

- A. 1. Tendrils; which are small strings that are not strong enough to stand alone, but support themselves by embracing some shrub, &c. near to them. The vine and pea will serve for examples of this.
- 2. Floral leaves; which are very small leaves placed near the flower.
- 3. Stipules; small leafy appendages, situate on the sides or below the leaf, to protect it when emerging from the bud.

- 4. Foot-stalks; these support the leaf, and defend and convey nourishment to the bud.
- 5. Flower-stalks, or footstalks to the flower and fruit.
- 6. Arms; which is the term given to the offensive parts of plants, as thorns, prickles, stings, &c.
- 7. Pubes; a name applied to the defensive parts, such as the hairy, woolly, or clammy substances common to certain plants.
 - Q. What is the flower?
- A. The flower is a temporary part of vegetables allotted to generation, and contributes principally to the fructification. It consists of seven principal parts, namely, the calyx, corolla, stamen, pistil, pericarp or seed-vessel, seed, and receptacle; the four first belong properly to the *flower*, and the three last to the *fruit*.

CHAP. III.

Elements of Botany.

- Q. What parts of a plant are necessary for the young Botanist to be first acquainted with?
- A. The flower and fruit: these consist of seven parts, as before observed, which are particularly requisite to be known, as on them the classification of plants, according to the system of Linnæus, is founded.
 - Q. What is the calyx?
- A. The calyx, empalement, or flower-cup, is the green part which is situated immediately below the blossom. Its chief use is to enclose and protect the other parts of the flower. It sometimes consists of two or more leaves, and is frequently tubular, like the cowslip, &c.
 - Q. What is the corolla?
- A. The corolla, blossom, or what is commonly called the flower, is the part which is

most beautifully coloured, of the finest texture, and is often odorous. The leaves which compose the corolla are called *petals*.

- Q. What is the stamen?
- A. The stamen, stamina, or chives, which are situated in the centre of the flower, are composed of two parts, one long and thin, by which they are fastened to the bottom of the coralla, called the *filament*, the other thicker, placed at the top of the filament, called the *anthera*, which opens when it is ripe, and discharges a yellowish dust called *pollen* or *farina*. On these the fructification and reproduction of the plant depend.
 - Q. What are the pistils?
- A. The pistils, or pointals, commonly appear in the centre of the coralla, from which they rise like so many columns. There are from one to twelve or more in each flower. The pistil consists of three parts.
 - Q. What are they?
- A. The germen, the style, and the stigma. The germen is the pedestal or base of the pistil, generally of a roundish shape, though

sometimes slender. Its office is to contain the seeds which are not yet arrived at maturity; the *style* is the pillar or thread which supports the stigma; and the *stigma* is the highest part of the pistil.

Q. What is the pericarp?

A. The pericarp, or seed-vessel, is the case or covering of the seed, and is the external part of the germen come to maturity. It is of various shapes; globular as in the poppy: long, as in the pod of the pea; pulpy, with a stone in the middle, as in the plum; pulpy, containing seeds enclosed in a case, as in the pear; juicy, and containing seeds which have only an external case, as the gooseberry.

Q. What is the seed?

A. The seed of plants is that part of every vegetable which at a certain state of maturity is separated from it, and contains the rudiments of a new plant, though the parts are too minute to be discerned by our organs of sight.

Q. What is the receptacle?

- A. The receptacle or base, is that part which supports and connects the whole together. In some plants it is very conspicuous: particularly for instance, in the artichoke; the whole of the lower part, which we eat, being the receptacle.
 - Q. When is a flower said to be superior?
- A. A flower is superior when the receptacle of the flower is above the germen.
 - Q. When is it inferior?
- A. When the receptacle is below the germen.
- Q. Is not a flower sometimes called naked?
- A. Yes; it is said to be naked when the calyx is absent.
- Q. Are not flowers sometimes called complete, and at other times incomplete?
- A. Yes; a flower is complete when it has both a calyx and coralla; and incomplete when either of these are deficient.
 - Q. What is an aggregate flower?
 - A. An aggregate flower, is a flower com-

posed of florets standing on footstalks, attached to a broad receptacle.

- Q. What is an umbellated plant?
- A. An umbellated plant is one which sends out towards the top, from the same point or centre, a number of branches like the spokes of an umbrella, and bearing flowers on the top.

CHAP. IV.

On the Classification of Plants.

- Q. What is intended by the classification of plants?
- A. For the more easy comprehension of the science of botany, Linnæus divided the whole vegetable creation into twenty-four classes. These are again divided into orders, which are subdivided into genera or tribes; and these genera are further divided into species, or individuals.
 - Q. On what is this system founded?
 - A. The Linnæan system is founded upon

a supposition that the stamens and pistils represent the sexual parts of fructification; and the discriminating characters of the classes are taken from the number, connexion, length, or situation of the stamens.

- Q. You say there are twenty-four classes: how may they be distinguished?
- A. In each of the first twenty classes there are stamens and pistils in the same flower; in the twenty-first class they are in distinct flowers on the same plant; in the twenty-second, in distinct flowers on different plants; in the twenty-third, they are in the same flower as well as in distinct ones; and they are not at all discernible in the twenty-fourth class.
- Q. As no progress can be made in Botany till the names of the classes are well understood, I will thank you to inform me from whence they are derived, and then repeat them.
- A. The names of the classes are formed from Greek words, and express the characteristics of each class. The first ten classes are

named from the Greek numerals, and the word andria, which the student must consider as synonimous with stamens.

CLASSES.

Monandria. One Stamen.
 Diandria. Two Stamens.
 Triandria. Three Stamens

Triandria. Three Stamens.
 Tetrandria. Four Stamens.

5. Pentandria. Five Stamens.

6. Hexandria. Six Stamens.

7. Heptandria. Seven Stamens.

8. Octandria. Eight Stamens.

9. Enneandria. Nine Stamens.

10. Decandria. Ten Stamens.

11. Dodecandria. Twelve Stamens.

12. Icosandria. Twenty Stamens.

13. Polyandria. Many Stamens.

14. Didynamia. Four Stamens, two longer.

15. Tetradynamia. Six Stamens, four longer.

16. Monadelphia. {Threads united at bottom, but separate at top.

17. Diadelphia. Threads in two sets.

18. Polyadelphia. Threads in many sets.

19. Syngenesia. Stamens united by anthera.

20. Gyandria. Stamens and pistils together.

Stamens and pistils in separate flowers, upon the same plant. 22. Diædecia.

Stamens and pistils distinct, upon different plants.

23. Polygamia.

Variously situated.

24. Cryptogamia.

Flowers invisible.

CHAP. V.

The Classification of Plants, recapitulated and explained.

Q. The principles on which the classes are formed are certainly simple and easily to be comprehended: but it will be necessary for us to recapitulate them, and distinguish the properties of each class more particularly, before we proceed farther. Tell me, therefore, how the first ten classes are known.

A. All plants which have only one stamen, are of the first class; those that have only two, are of the second; those that have only three, are of the third; and so on, the number of stamens being the same with the number of the class in the first ten classes.

Q. How is the eleventh class (Dodecandria) known?

A. The eleventh class contains all those plants, which have from twelve to nineteen stamens, fixed to the receptacle.

Q. How is the twelfth class (Icosandria) known?

A. By having twenty stamens, fixed to the inside of the calyx. In this class the place of insertion is more to be relied on than the number of the stamens, for they are sometimes less than twenty, and sometimes more.

Q. What plants are comprehended in the thirteenth class (Polyandria)?

A. Those that have more than twenty stamens attached to the receptacle.

Q What distinguishes the fourteenth class, (Didynamia)?

A. When there are four stamens in a flower, of which two are longer than the other, it belongs to the fourteenth class.

Q. How may the fifteenth be known?

A. Tetredanamia, the fifteenth class, is

known by having six stamens in the flower, four of which being longer than the other two.

- Q. Describe those of the sixteenth class (Monadelphia.)
- A. In the sixteenth class the stamens are united by their filaments into one set, forming a case round the lower part of the pistils, but separating at the top.
- Q. How may the seventeenth class (Diadelphia) be distinguished?
- A. In the seventeenth class the corollas are papillionaceous, like the blossom of a bean; the stamens are connected by their filaments, but divided into two sets, one of which is thicker, and forms a case round the pistil; the other is smaller, and leans towards the pistil.
 - Q. How is the eighteenth class known?
- A. In the eighteenth class (Polyadelphia) the stamens are united by their filaments into more than two sets or parcels.
- Q. By what means may the nineteenth class be known?
 - A. Syngenesia (the name of the nineteenth)

consists of compound flowers, as the common daisy or dandelion; and they are called compound, because each single flower consists of a collection of little flowers or florets, attached to the same broad receptacle, and contained within one calyx.

- Q. What distinguishes the twentieth class (Gynandria)?
- A. In the twentieth class the stamens are attached to the pistil.
- Q. What may the twenty-first class be known by?
- A. The twenty-first class (Monœcia) contains those plants which have flowers of different kinds on the same plant, some bearing pistils, and others stamens only.
- Q. How may the twenty-second class (Diœcia) be known.
- A. The twenty-second class consists of those species which have stamens on one plant and pistils on another.
- Q. What kind of plants does the twenty-third class (Polygamia) comprehend?
 - A. The twenty-third class comprehends

those plants which have at least two and sometimes three kinds of flowers. 1. Some anther-stigmate, or with pistils and stamens on the same flower. 2. Others having pistils only, or stamens only. 3. Or having flowers with pistils only, or stamens only.

- Q. What are comprehended in the twenty-fourth class?
- A. The twenty-fourth class (Cryptogamia) comprehends all plants in which the flowers are invisible to the naked eye, as mosses, ferns, mushrooms, &c.

CHAP. VI.

Of the Orders of Plants.

Q. On what are the Orders founded?

A. The formation of the orders is as ingenious and simple as that of the classes. In the first thirteen classes, the orders are founded wholly on the number of the pistils; so that by adding gynia instead of andria, to the Greek words signifying the numbers, they

will be easily recollected. Where they are not distinguished by the number of the pistils, their names are taken from some circumstances relative to the stamens, pistils, or seed.

Q. Name the first thirteen orders.

A. Monogynia ... 1 pistil.

Digynia ... 2 pistils.

Trigynia ... 3 pistils.

Tetragynia ... 4 pistils.

Pentagynia ... 5 pistils.

Hexagynia ... 6 pistils.

Heptagynia ... 7 pistils.

Octagynia ... 8 pistils.

Enneagynia ... 9 pistils.

Decagynia ... 10 pistils.

Dodecagynia ... 12 pistils.

Q. How many orders are there of the fourteenth class (Didynamia), and how are they known?

Polygyma.... many pistils.

A. In the fourteenth class there are only two orders, which depend on the presence or absence of the pericarp or seed-vessel.

- 1. Gymnospermia. Naked seeds in the bottom of the calyx; as in mint, dead nettle, and thyme.
- 2. Angiospermia. Seeds enclosed in a pericarp; as in fox-glove, eye-bright, wood-flax, and fig-wort.
- Q. What orders are there of the fifteenth class?
- A. Two; which are taken from a difference in the form of the pericarp.
 - 1. Siliculosa. Seeds enclosed in a silicle or roundish seed-vessel, consisting of two pieces called valves, and the seeds fixed to both edges, or sutures, as in shepherd's purse, and scurvy-grass.
 - 2. Siliquosa. Seeds enclosed in a silique or long seed-vessel; as in mustard.
- Q. How are the orders of the next four classes known?
- A. In the classes Monadelphia, Diadelphia, Polyadelphia, and Gynandria, the orders are distinguished by the number of stamens; viz.

Pentandria, five stamens; Hexandria, six stamens, &c.

- Q. How many orders are there in the nine-teenth class (Syngenesia)?
- A. There are six orders in the nineteenth class, which are taken from the structure of the flower.
 - 1. Polygamia Æqualis; having both stamens and pistils in the same floret; as in dandelion, thistle, &c.
 - 2. Polygamia Superflua; when the flower is composed of two parts—a disk, or central part, and rays projecting outwards; as in tansy, daisy, ground-sel, camomile, &c.
 - 3. Polygamia Frustranea; the florets of the centre perfect or united; those of the margin without either stamens or pistils; as blue-bottles.
 - 4. Polygamia Necessaria; where the florets in the disk, though apparently perfect, are not really so, and therefore produce no perfect seed; but the fertility

of the pistilliferous floscules in the ray compensate for the deficiency of those in the centre of the flower; as in the marygold.

- 5. Polygamia Segregata; when each of the florets has a calyx, besides the common or general calyx of the flower.
- 6. Monogamia; when the flower is not compound, but single, and the anthere united.
- Q. From what are the orders formed in the next three classes?
- A. In the classes Gynandria, Monæcia, and Diæcia, the orders are formed from the number and other peculiarities of the stamens:

Monandria1 stamen.

Diandria, &c. .. 2 stamens, &c.

Polyandria 7 stamens.

Monadelphia .. { stamens united into one set.

Polyadelphia .. { stamens united into different sets.

Gynandria { stamens upon the pistil.

Q. How many orders are comprised in the twenty-third class?

A. The twenty-third class (Polygamia) comprises three orders; namely, Monacia, Dacia, and Triacia.

Q. How many orders has the last class (Cryptogamia)?

A. Four; ferns, mosses, sea-weeds, and funguses.

CHAP. VIII.

CLASS I .- Monandria.

Q. What examples can you furnish me with of the class Monandria.

A. Most of the plants belonging to this class are natives of India, such as ginger, cardamoms, arrow-root, and turmeric; but we have the *hippuris*, or mare's tail, which grows in our muddy pools and ditches, and

as it is easily procured, will serve for an example.

- Q. Describe it.
- A. It has neither calyx nor corolla. Its single stamen grows upon the receptacle, terminated by an auther slightly divided, behind which is the pistil, with an awi-shaped stigma, tapering to a point. The stem is straight and jointed, and the leaves grow round the joints; at the base of each leaf is a flower, and it is seen in bloom in the month of May.

CHAP. VIII.

CLASS II.—Diandria.

- Q. WITH what examples can you furnish me in class Diandria?
- A. The Privet (Ligustrum) being a shrub very common in our hedges and gardens, will serve to exemplify this class.
 - Q. Give me an account of it.
 - A. The privet bears a white blossom, and

generally flowers in June. It has a very small tubulated calyx of one leaf, its rim divided into four parts. The blossom is also monopetalous, and funnel-shaped, with an expanded border, cut into four egg-shaped segments.

- Q. How is it known to belong to this class?
- A. By its having two stamens, which are placed opposite to each other, and nearly as long as the blossom. The seed bud is roundish, the pistil or style short, terminated by a thick, blunt, cloven stigma. The leaves grow in pairs, and are sometimes variegated with white or yellow stripes.
 - Q. Does not the privet bear berries?
- A. Yes; the seed-vessel is a black berry, containing but one cell, which encloses four seeds. These berries are useful to the dyers, as they give a durable green colour to silk or wool, by the addition of alum.
- Q. Does not the common jasmine (Jasminum officinale) belong to class Diandria?
 - A. Yes; and as it a most fragrant orna-

mental shrub which we are well acquainted with, I will, if you please, describe it.

Q. I will thank you to do so.

A. The common jasmine is a native of India, but has long been cultivated in Europe. It is chiefly raised against walls, and is interesting not only from the elegance of its foliage, but also from the number of beautiful white silver-shaped flowers with which it is adorned, which exhale a sweet odour, particularly after rain, and in the night.

CHAP. IX.

CLASS III.—Triandria.

- Q. How do you mean to illustrate the class Triandria?
- A. By giving you an account of some of the various grasses, which are comprised in it. Though it may appear surprising, it is no less true, that every single blade of these apparently insignificant plants bear a distinct

flower, perfect in all its parts; and only requires to be nicely viewed to excite our value and admiration.

- Q. Are there not many varieties of grasses?
- A. Yes; there are upwards of three hundred species. The general character of grasses may be thus described: the leaves furnish pasturage for cattle; the smaller seeds are food for birds, and the larger for man; but some are preferred to others: as fescue for sheep; meadow-grass for cows; canary for small birds; oats and beans for horses; rye, wheat, and barley for men.
- Q. Do they not furnish us with many valuable necessaries?
- A. Yes; our most important articles of food and clothing are derived from them. Bread, meat, beer, milk, butter, cheese, leather, and wool, and all the advantages produced from the use of cattle, would be lost without them?
- Q. How may corn and grasses be distinguished from other plants.
 - A. By their simple, straight, unbranched

stalk, hollow and jointed, commonly called a straw, with long, narrow, tapering leaves, placed at each knob or joint of the stalk, and sheathing or enclosing it, as by way of support: their ears or heads consist of a husk, generally composed of two valves, which form the calyx; within which is the blossom, being also a husk of two valves.

Q. How are the various grasses divided?

A. Linnæus has arranged them into four divisions; the first three include those that are produced in panicles, or loose branches, which are distinguished by the number of flowers in each empalement; the first having one flower; the second, two; and the third, several. The fourth division consists of all those that grow in spikes or heads, such as wheat, rye, barley, &c.

Q. Describe wheat.

A. Wheat, the chief support of man, is cultivated in most civilized countries of the world, and is supposed to have been originally introduced into Europe from Asia. There is no grain so valuable as this; and it is wisely

ordained by Providence, that it is capable of sustaining the severity of northern climates, and the excessive heat of the torrid zone.

- Q. Does it not constitute the principal food for all classes of the community in Britain?
- A. Yes; and its abundance or scarcity regulates, in a great degree, the welfare and prosperity of the inhabitants. The whole annual consumption of grain in this island is said to amount to twenty-five million of quarters: and in London alone, to more than 1,162,100 quarters, of which by farthe greatest proportion is wheat.
- Q. Is not sugar the produce of a plant belonging to this class?
- A. Yes; the sugar-cane, (Saccharum Of-ficinarum) a plant much cultivated in the East and West Indies, which has a jointed stem eight or nine feet high, long and flat leaves of a greenish yellow colour, and flowers in bunches.
 - Q. What methods are used to extract the sugar from the canes?

- A. When cut down, the leaves are thrown away, and the stems or canes are divided into pieces, each about a yard in length: they are then tied up in bundles, and conveyed to the mill, where they are bruised between three upright wooden rollers covered with iron. The saccharine juice which flows from them is conducted into a large vessel, and the quantity of juice prepared by some of these mills is upwards of ten thousand gallons in a day.
- Q. What processes does it afterwards undergo?
- A. The juice is boiled in large caldrons, and afterwards carefully drawn off, leaving the scum at the bottom of the pan. After being again boiled, with a certain mixture of lime, the juice is transferred into a large shallow wooden vessel, where, as it cools, it runs into a sort of crystallization, by which it is separated from the melasses or treacle, an impure part of the juice, incapable of being crystallized, but which is used for various useful purposes.

CHAP. X.

CLASS IV .- Tetrandria.

- Q. How are the flowers of the class Tetrandria characterised?
- A. They are characterised by having four stamens, two of them being long, and two short.
 - Q. Give me some examples.
- A. Teasel, madder, sandal wood, and holly.
 - Q. What is teasel?
- A. Teasal (Dipsacus fullonum) is a plant cultivated in several parts of England, and used in the carding of woollen cloths. It is distinguished from other plants of the same tribe, by having its leaves connected at the base; the flower scales hooked; and the general calyx reflected or bent back.
 - Q. What is holly?
- A. Holly (Ilex aquifolium) is a small evergreen tree, with shining irregular leaves,

and white flowers, which grow in clusters round the branches, and are succeeded by small red berries.

Q. What is the use of this plant?

A. As a fence, holly is very serviceable, and it retains its beautiful green verdure through the severest winters. The wood is very close grained, and is used for many purposes. The leaves afford a grateful food to sheep and deer in winter; and the berries yield a subsistence to numerous birds. We use branches of holly to decorate our houses and churches at Christmas, to give an air of spring in the depth of winter.

Q. Is not bird-lime made from the bark of the holly?

A. Yes; and for that purpose it is boiled about twelve hours, and after standing for a fortnight is mixed over the fire with a third part of oil. The adhesive quality of birdlime, thus prepared, is very remarkable, particularly to feathers and other dry substances; for which reason it is used for the smearing of twigs, to ensuare birds.

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CHAP. XI.

CLASS V.—Pentandria.

- Q. GIVE me some examples of this class.
- A. It will be very easy to do so, for in the class Pentandria is comprised one-tenth of the vegetable world; and it includes many very agreeable flowers as well as noxious plants. The primrose, oxlip, cowslip, and polyanthus belong to it; and so do a tribe of plants called *Luridæ*, which is a name expressive of their noxious appearance and strong scent.
 - Q. Describe the polyanthus.
- A. The polyanthus, so much admired and cultivated by florists for its variety and beauty, is derived from the primrose; and is a pleasing instance of the improvement that art is capable of bestowing on nature.
 - Q. How is it known?
- A. By its calyx consisting of one leaf, tubular, sharp, and upright; the blossom also

tubular, and of one petal, with the border divided into five segments; the seed-vessel is a capsule enclosed in the calyx, containing only one cell; and the stigma is globular. The species is marked by a five-angled calyx, the wrinkled surface and indented edges of its leaves.

- Q. How are those plants belonging to the tribe called luridæ distinguished?
- A. Besides having the characteristic marks of five stamens and one pointal, they coincide in a calyx that is permanent, and divided, like the corolla, which consists of one petal, into five segments. Their seed-vessel is either a capsule or a berry, enclosed within the flower.
- Q. Will you furnish me with an example?
- Q. Yes; I will first mention the deadly nightshade (Atropa), as it is the most fatal of any in its effects. The leaves are egg-shaped and undivided, and the blossoms of a dingy purple. Woods, hedges, and gloomy lanes mostly conceal this dangerous plant;

and its bright shining black berries have too frequently tempted children to partake of its dangerous poison.

- Q. What are the names of the other poisonous plants belonging to this class?
- A. The thorn apple (Datura); henbane (Hyosycamus), the smell of which is exceedingly disagreeable; the nightshade, (Solanum), which comprises three kinds, the woody nightshade, known by its blue blossoms and red berries; the garden nightshade, distinguished by its white blossoms and black berries; and the deadly nightshade before described.

CHAP. XII.

CLASS VI.—Hexandria.

- Q. What kind of plants belong to the class Hexandria?
- A. Our gardens receive many of their most splendid embellishments from flowers of this

description. The gaudy tulip, with its striped coat of various hues; the hyacinth, of different colours and delightful fragrance; lilies of every kind; the magnificent amaryllis; and the great American aloe, which rises to the height of twenty feet, and many other exotic plants of the liliaceous tribe, are comprised in this class.

- Q. Do not many of our smaller garden flowers also belong to this class?
- A. Yes; the modest snow-drop, the golden crocus, and the innocent and fragrant lily of the valley, with the daffodil, narcissus, and many others.
- Q. Give me a botanical description of the snow-drop.
- A. The snow-drop (Galanthus) is one of the earliest harbingers of spring. Its calyx is a sheath, and the corolla is superior, consisting of six white petals, a little tinged with green, of which the three innermost are the shortest. This beautiful little flower never appears to more advantage than when it intermixes its blossoms with those of the golden

crocus, to which in its manner of growth and external structure, it is nearly allied.

CHAP. XIII.

CLASS VII.—Heptandria.

- Q. What example can you give in this class?
- A. The horse-chesnut (Æsculus Hippocastanum) which is a very common tree in parks and pleasure grounds, bearing elegant clusters of flowers in the form of pyramids; and is certainly one of the finest trees of British growth. Its fruit which is contained in prickly husks, has been found of considerable service in fattening cattle.
 - Q. What are its botanical characters?
- A. A small calyx, of one leaf, slightly divided at the top into five segments, and swelling at the base; a corolla of five petals, inserted into the calyx, and a capsule of three cells, in one or two of which only is a seed.

CHAP. XIV.

CLASS VIII.—Octandria.

- Q. What kind of plants are comprised in this class?
- A. Various shrubs, both foreign and native; among the foreign ones are the balm of Gilead shrub, which grows in several parts of Abyssinia and Syria; the sugar-maple of North America, which is fifty or sixty feet high; and the rose-wood tree, in the island of Jamaica; which yields an odoriferous balsam, and whose wood is much used by our cabinet-makers for veneering tables, &c.
- Q. What native plants are comprised in this class.
- A. The common maple and sycamore trees, and the cranberry and whortle berry shrubs, with that well-known plant, the common heath, growing wild on mountainous wastes in almost every part of England.

CHAP. XV.

CLASS IX .- Enneandria.

- Q. What examples can you furnish in this class?
- A. The class Enneandria includes several foreign plants, such as cinnamon, cassia, sassafras, bay, camphor, and rhubarb; but we have only one plant that belongs to it, growing wild in this country, which is the flowering rush (Butomus).
 - Q. Describe it.
- A. The flowering rush grows in the water, and has a round, smooth stalk, which rises from one to six feet high, according to its situation, at the top of which is a head of bright red flowers, sometimes not less than thirty; three short leaves form the cup, and the corolla has six petals. This plant, so stately from its height, and its beautiful tuft of flowers, would make a charming appearance in canals or other pieces of water, if

cultured by human art; and it is so hardy as defy the severest frost.

CHAP. XVI.

CLASS X .- Decandria.

- Q. WHAT kind of plants does this class comprise?
- A. In the class Decandria are comprised several trees of foreign growth, as well as various plants and flowers common in this country. The lignum-vitæ tree, log-wood, and mahogany, all natives of the West Indies, each belong to this class.
- Q. What well-known flowers belong to
- A. The rich carnation, the modest sweet William, and the whole tribe of pinks.
- Q. Describe the tree from which the wood called mahogany comes?
- A. The mahogany tree is of large dimensions, with winged leaves and small white flowers;

its branches are numerous and spreading; its leaves are alternate and winged, with four or five pair of leaflets, somewhat spear-shaped. It grows in Jamaica and Honduras.

- Q. Has not the cutting of mahogany been a source of considerable profit to the British settlers at Honduras?
- A. Yes; in some instances the profit attending it has been very great. A single tree has been known to contain twelve thousand superficial feet, and to have produced 1000l. sterling. The body of the tree is of course the most valuable, but for ornamental purposes the limbs are preferred, as the veins are more variegated and the grain is closer.

CHAP. XVII.

CLASS XI.—Dodecandria.

- Q. Give an example of this class.
- A. I know of no one more valuable or in-

teresting than weld, or dyer's weed, which is found on barren ground, or on walls; and in the clothing counties in England is cultivated to a considerable extent. Its leaves are spear-shaped, and entire, with a tooth-like process on each side of the base. The flowers are yellow, and in long spikes; and the calyx is divided into four segments.

Q. For what is it useful?

A. It affords a most beautiful yellow dye for cotton, woollen, silk, or linen, which is procured from its roots and stems; and blue cloths dipped in a decoction of it become green. The yellow hue of the paint called Dutch pink is also obtained from this plant; and it is said that the ancient Britons used it to stain their bodies with.

CHAP. XVIII.

CLASS XII.—Icosandria.

Q. What plants belong to the class Ico-sandria?

- A. A great variety of fruit-trees, such as the apple, pear, cherry, plum, nectarine, peach, almond, and medlar. Also various shrubs and herbs, such as laurels, roses, strawberries, &c.
- Q. Is it true that all plums derive their origin from the bullace or wild plum?
- A. It is an established fact; though few persons would suppose, that the magnum bonum, the green gage, and several others of exquisite flavour, which are now common in our gardens, could be indebted for their parent stock to the wild plum.
- Q. Do you not consider the rose as one of the most elegant and fragrant of all vegetable productions?
- A. Yes; and for that reason it has been denominated the queen of flowers. It is so general a favourite that scarcely any garden is destitute of a rose. That elegant perfume called otto of roses is extracted from its petals by distillation, but so small a quantity of this aromatic oil can be procured, that the true otto is exceedingly dear. It is said that

an hundred pounds weight of the flowers will yield only, half an ounce of it.

CHAP. XIX.

CLASS XIII.—Polyandria.

- Q. WHAT examples will you give me in this class?
- A. The poppy and the tea-tree; the former being the plant from which opium and laudanum are produced; and the latter affording us a beverage, which is now drank by all classes in this country.
- Q. From what part of the plant is opium produced?
- A. From the seed vessels, in which several gashes are made, and a milky fluid exudes, which when it attains sufficient consistence is formed into balls or cakes, and is of a dark brown colour. Its uses in medicine to cause sleep and alleviate pain are well known. Laudanum is a liquid preparation from

opium and spirits of wine, and is used for the same purposes.

- Q. Describe the tea-tree.
- A. The tea-tree is an evergreen shrub, about five or six feet high, and much branched. It flourishes, with great luxuriance, in vallies, on the sloping sides of hills, and on the banks of rivers. The leaves are narrow and tapering; the flowers not much unlike those of the white wild rose, but smaller; and are succeeded by a fruit about the size of a sloe, containing two or three seeds. It is chiefly cultivated in the mildest and most temperate parts of China.

CHAP. XX.

CLASS XIV .- Didynamia.

- Q. What sort of plants are comprehended, in this class?
 - A. Many which are distinguished by us as

garden herbs, and valued for their odoriferous smell and kitchen uses, as well as for the medicinal qualities which some of them possess.

Q. Mention one as an example.

A. Common or spear-mint, (Mentha viridis) one of our most common garden herbs; it is a native British plant, and grows wild in watery places, and near the banks of rivers, in several parts of England. Its flavour is to many persons peculiarly agreeable, and on this account it is preferred for many culinary purposes. The leaves are used in spring sallads, are boiled with peas, &c. and, mixed with vinegar, form a sauce for lamb.

CHAP. XXI.

CLASS XV.—Tetradynamia.

- Q. WHAT kind of plants compose this class?
- A. The plants in this class are innoxious,

and generally supposed to possess anti-scorbutic qualities. In it we find the cabbage, the turnip, the water-cress, and mustard, with a variety of wild plants and flowers.

- Q. Give me a description of mustard.
- A. Common mustard is made from the powdered seeds of a plant (Sinapis nigra), which grows wild in corn fields, and by road sides, in most parts of England, and is known by its yellow cruciform flowers, with expanding calyx, and its pods being smooth, square, and close to the stem.
 - Q. Is it not cultivated by us?
- A. Yes; in light lands it is cultivated to great advantage, particularly in the county of Durham, and that which is produced there is considered the best.
 - Q. What are its uses?
- A. Mustard is in daily use at our tables, and the seeds are used in pickles. Preparations from mustard are also often employed in medicine, both internally and externally.

CHAP. XXII.

CLASS XVI.—Monadelphia.

- Q. GIVE me an example in this class.
- A. I know of none more interesting or useful than the cotton plant, which is cultivated in the East and West Indies, and numerous other hot countries. It grows to a considerable height, and has leaves of a bright green colour, with flowers of only one petal, of a pale yellow colour, with five red spots at the bottom. The seed-vessels, or cotton pods, contain a soft vegetable down, which envelope the seeds.
- Q. Is not the cloth we call cotton made from this down?
- A. Yes; after being gathered and carefully separated from the seeds, it is packed in bags, and imported into this country. Here it undergoes the processes of carding, spinning, and weaving, which were formerly performed

by hand, but is now, for the sake of expedition, effected by machinery.

CHAP. XXIII.

CLASS XVII.—Diadelphia.

- Q. What examples can you furnish me with under the head Diadelphia?
- A. Many plants well known to us are comprehended in it; such as peas, beans, vetches, clover, lucern, broom, furze, &c.; but a description of one of them I imagine will be sufficient.
 - Q. Well, then, describe the broom.
- A. The common broom is a shrub seen on sandy heaths in most parts of England; it has large yellow, butterfly-shaped flowers, with leaves in threes, and the branches are without prickles. This shrub is distinguished from furze, which consists of a cup with two leaves, and is still more common here than broom, though in other countries it is quite scarce.

CHAP. XXIV.

CLASS XVIII.—Polyadelphia.

- Q. WHAT description of plants are arranged in this class?
- A. Several foreign fruit-trees, such as the orange, the lemon, the citron, and the cocoanut trees.
 - Q. Describe the orange and lemon trees.
- A. The orange and lemon shrubs are evergreen plants; the latter has large and slightly indented shining leaves, of somewhat oval shape, but pointed; the flowers are large and white, but of a purplish hue on the outside of the petals. The orange-tree is distinguished from the lemon, by having a kind of winged appendage on the leaf stalks, of which the latter is destitute.
- Q. What properties do the fruit of these trees possess?
- A. Oranges, when ripe, are extremely sweet, grateful, and wholesome. In fevers and other complaints, they are very service-

able in allaying heat and quenching thirst. The juice of lemons is sharp and agreeable, and is used in cookery, confectionary, medicine, and various other ways. The rind is also used in cookery and confectionary, and is valued for its aromatic and bitter taste.

CHAP. XXV.

CLASS XIX.—Syngenesia.

- Q. Describe some plant under the class Syngenesia.
- A. As I mentioned the daisy and dandelion as examples of this class, in the fifth chapter, I will describe the one you prefer.
- Q. Then I think the beauty of the humble daisy justly entitles it to my preference.
- A. The daisy, which so delightfully enamels every meadow, will not be disregarded by the botanist if taken separately; for there is much beauty and variety discernible in this little flower. The cally is formed

of a double row of spear-shaped leaves: the numerous tubular florets in the centre are yellow, and furnished with both stamens and pistils, while those composing the ray, which are white above and pink beneath, contain pistils only. The receptacle is naked and conical, and a naked stalk supports a single flower.

CHAP. XXVI.

CLASS XX.—Gynandria.

- Q. What plants are comprised in this class?
- A. Several well-known field plants of the orchis tribe.
 - Q. Describe them generally.
- A. They have an oblong withered germ, below the flower, which has no proper calyx, but only sheaths; the corolla consists of five petals, the two innermost of which usually join to form an arch or helmet over the top

of the flower. In some species the root is composed of a pair of solid bulbs; in others it consists of a set of oblong, fleshy substances, tapering towards the ends.

CHVP. XXVII.

CLASS XXI.—Monacia.

- Q. Mention some of the plants comprised in this class.
- A. There are a variety of trees and plants, both native and foreign, that belong to it. Among those of native growth may be reckoned the oak, birch, alder, beech, walnut, sweet chesnut, fir, hazel nut, filbert, and mulberry trees; and the numerous kinds of sedges. In the list of foreign plants; may be noticed, the bread-fruit tree, the cork tree, the cocoa-nut tree, the tallow tree, maize or Indian corn, and many others.
- Q. Give an example of one of the most interesting among those of British growth.

- A. That is the oak, which is a well known timber tree, invaluable to us, for to it the British navy is indebted for its existence. Until the introduction of mahogany, oak-timber was very generally used for furniture, but it is now chiefly consumed in ship-building. The tree is remarkable for the slowness of its growth, for its great longevity, and the dimensions to which it attains.
 - Q. Is not the bark of oak very useful?
- A. Yes; before oak-timber is in a state to be used, it is requisite that the bank should be stripped off, and then suffered to stand uncut for three or four years, that they may become perfectly dry; and the bank thus obtained is very extensively used in the tanning of leather.
 - Q. Describe the cork tree.
 - A. The cork-tree grows in Spain and Portugal, and is a species of the oak; the external bark is of a fungous texture, which when stripped off is that elastic substance we call cork, so serviceable for stopping bottles, &c.

CHAP. XXVIII.

CLASS XXII.—Diacia.

- Q. GIVE me an example of some plant comprehended in this class.
- A. As there are many varieties of the willow every where to be met with, all of which belong to this class, I will describe the one most remarkable for its singularity, which is the round-leafed willow. Its leaves are smooth, entire, and egg-shaped; the upper surface is green and wrinkled; the under one is bluish, and covered with a net-work of veins, which are at first red, but afterwards become green. It is but a low shrub, and produces both flowers and leaves from the same bud.

CHAP. XXIX.

CLASS XXIII.—Polygamia.

- Q. DESCRIBE some plant of this class.
- A. To the negroes of the West Indies there

is no production more serviceable than the plaintain tree; I therefore select it. Its stem grows to the height of about twenty feet, with several leaves on the summit, many of which are eight feet long and two feet broad, but remarkably thin and tender. The fruit is of a pale yellow colour, and is produced in bunches so large as to weigh about forty pounds.

- Q. In what way is this plant so service-able?
- A. The fruit is to the negroes, what bread is to us, and is denominated by them the staff of life. It is usually gathered before it is ripe, and after the skin has been peeled off, is roasted for a little while in a clear fire; it is then scraped and eaten as bread, for which it is an excellent substitute.

CHAP. XXX.

CLASS XXIV.—Cryptogamia.

- Q. WE are now come to the last class, which I believe you said comprehended all plants in which the flowers are inconspicuous, such as mosses, ferns, funguses, &c.
- A. I did; and among the latter mushrooms are of course included. The common mushroom is a fungus, consisting of a white stalk, and a convex cover of white or brownish colour, which has beneath an irregular arrangement of gills of a pink hue when young, but afterwards a dark liver colour. When it first appears above the ground, a mushroom is smooth and nearly globular, and in this state it is called a bitton.
- Q. Ought not great caution to be used in selecting them?
- A. Certainly; for though several of them are edible, many are extremely poisonous; and instances of the fatal effects arising from

an indiscriminate adoption of them are very numerous. An emetic is the best remedy that can be administered in cases of injury arising from poisonous funguses.

APPENDIX.

Of the Method of forming an Herbarium, or Hortus Siccus.

It has been observed by the best writers on Botany, that every person who wishes to become a complete Botanist will find it necessary to preserve and to form into a collection the plants which he has examined. We therefore present to those who have made some progress in this interesting study, a few directions which we have extracted from a scientific treatise.

"The best method of preserving them is by drying them: specimens ought to be collected when dry, and carried home in a tin box. Plants may be dried by pressing, in a box of sand, or with a hot smoothing-iron. Each of these has its advantages.

- "1. If pressure be employed, a botanical press may be procured. The press is made of two smooth boards of hard wood, eighteen inches long, twelve broad, and two thick. Screws must be fixed to each corner, with nuts. If a press cannot easily be had, books may be employed.
- "Next, some quires of unsized blossom blotting paper must be provided. The specimens when taken out of the tin-box must be carefully spread on a piece of pasteboard, covered with a single sheet of the blossom paper quite dry; then place three or four sheets of the same paper above the plant, to imbibe the moisture as it is pressed out; it is then to be put into the press. As many plants as the press will hold may be piled up in this manner. At first they ought to be pressed gently.
- "After being pressed for twenty-four hours or so, the plants ought to be examined, that any leaves or petals which have been folded may be spread out, and dry sheets of paper laid over them. They may now be replaced

in the press, and a greater degree of pressure applied. The press ought to stand near a fire or in the sunshine. After remaining two days in this situation, they should be again examined, and dry sheets of paper be laid over them. The pressure then ought to be considerably increased. After remaining three days longer in the press, the plants may be taken out, and such as are sufficiently dry may be put in a dry sheet of writing paper. Those plants which are succulent may require more pressure, and the blossom paper again renewed.

"Plants which dry very quickly, ought to be pressed with considerable force when first put into the press; and if delicate, the blossom paper should be changed every day. When the stem is woody it may be thinned with a knife, and if the flower be thick or globular, as the thistle, one side of it may be cut away; as all that is necessary, in a specimen, is to preserve the character of the class, order, genus, and species.

[&]quot;2. Plants may be dried in a box of sand

in a more expeditious manner, and this method preserves the colour of some plants better. The specimens, after being pressed for ten or twelve hours, must be laid within a sheet of blossom paper. The box must contain an inch deep of fine dry sand, on which the sheet is to be placed, and then covered with sand an inch thick; another sheet may then be deposited in the same manner, and so on, till the box be full. The box must be placed near a fire for two or three days. Then the sand must be carefully removed, and the plants examined. If not sufficiently dried, they may again be replaced in the same manner for a day or two.

"3. In drying plants with a hot smoothingiron, they must be placed within several sheets of blotting-paper, and ironed till they become sufficiently dry. This method answers best for drying succulent and mucilaginous plants.

"4. When properly dried, the specimens should be placed in sheets of writing paper, and may be slightly fastened by making the

top and bottom of the stalk pass through a slip of the paper, cut neatly for the purpose. Then the name of the genus and species should be written down, the place where it was found, nature of the soil, and the season of the year. These specimens may be collected into genera, orders, and classes, and titled and preserved in a portfolio or cabinet."

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